Post-operative Shoulder Pain and Neuropraxia in the Obese Lower Extremity Reconstruction Patient: A Case Report

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STATEMENT OF PURPOSE

The purpose of this case report is to describe the findings of persistent post operative shoulder pain and upper extremity neuropraxia in an obese lower extremity reconstructive surgery patient and to discuss the need for special consideration of operating table positioning unique to the obese patient in order to prevent upper extremity musculoskeletal and neurological complications.

LITERATURE REVIEW

While there are publications in anesthesia and nursing literature regarding airway and cardiopulmonary management of the obese and morbidly obese patient, there is no published literature describing special considerations for safe OR positioning of the obese patient in order to prevent musculoskeletal (MSK) complications. Most MSK post operative complications previously reported are due to lateral decubitus or prone positioning.

The brachial plexus supplies the upper extremity and shoulder, arising from the spinal roots C5-T1. Nerve branches pass through the axilla en route to the arm.

Anatomic studies have demonstrated that use of wrist bands on arm boards pulls the humeral head downward, compressing the brachial plexus.

Abduction of more than 90º of the arm stretches the brachial plexus over the head of the humerus and coracoid process.

Compression of the brachial plexus results in ischemia, which is thought to be the cause of nerve injury.

Recommendations for OR positioning of the general surgical population, non-specific to obese patients include:

- Axillary roll in lateral decubitus position to prevent brachial plexus injury
- Padding of common peroneal nerve in lateral decubitus position
- Abduction of arms to 45 degrees in supine position

CASE REPORT

A 37 year old male with past medical history of Type 2 Diabetes Mellitus, morbid obesity, and Charcot neuroarthropathy with rocker bottom deformity underwent complex reconstruction of the right lower extremity. The patient was placed in a supine position for the entirety of the surgery with bilateral arms secured to arm boards in a standard fashion. The duration of the procedure was 6 hours and 32 minutes. The body mass index (BMI) of the patient was 44.8. The procedure went well with no intra-operative complications. However, post operatively, the patient had a complaint of left shoulder pain and left upper extremity weakness and numbness. He reported numbness to his fingers and expressed difficulty in using his left arm. On exam, he had decreased sensation to his digits but maintained full motor function to all flexors and extensors of the hand, wrist and elbow. He did display weakness of the left shoulder with demonstrated weakness with abduction of the arm and raising the left arm above the head. While the patient did complain of some post operative pain to the operative lower extremity, his greatest complaint in the initial post operative period was his left sided upper extremity neurological symptoms.

Figure 1. Arm resting in dependent position, unsupported

The patient was evaluated by orthopedic surgery who determined that he had neuropraxia of the left upper extremity due to prolonged stretching of the brachial plexus intra-operatively. The symptoms resolved after four days. The patient then regained full return of function and sensation to the left upper extremity with no recurrence of symptoms.

DISCUSSION

The prevalence of obesity among all adults in the United States was 39.8% in 2015-2016 with even higher percentages in populations over 40 years of age. Obesity is defined as a BMI greater than 30 and morbid obesity as a BMI of 40 or greater. With such a high prevalence of obesity, foot and ankle surgeons today frequently face challenges in the management of these patients in terms of operating room (OR) positioning, technical execution of surgical procedures, and perioperative morbidity.

Special consideration should be taken in positioning of the obese patient on the operating room table, particularly for longer, more complex surgeries to prevent post operative complications.

The authors have noted that morbidly obese patients often have a thicker layer of adipose tissue on their backs posterior to the axilla. This increased depth of the back tissues subsequently increases the distance from the shoulder to the OR bed and arm boards while in a supine position. This tethered, dependent position of the arms places potential strain on the anterior shoulder and underlying neurological structures. Therefore, this complication could likely be prevented by building the height of the arms boards with padding to hold the arm and shoulder level.

Figure 2. Arm parallel to axilla, supported

CONCLUSION

- The morbidly obese surgical patient requires special consideration and positioning to prevent post operative complications unique to their body habitus
- Significantly increased thickness of adipose tissue posterior to the axilla may result in a dependent position of the arms on arm boards
- Dependent position or excessive abduction of the arms may predispose to increased strain on the brachial plexus while supine
- Longer procedure times increase duration of ischemia to to compressed nerve and subsequent risk of neuropraxia or other nerve injury.
- Padding should be applied to arm boards to elevate the arm parallel to the level of the axilla to minimize strain on the axilla and its structures. Abduction of >45 degrees should be avoided.

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